

## New Flea and Cimicid Records from Birds in Virginia

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### INTRODUCTION

Ten species of fleas (Order Siphonaptera) are found on birds in eastern North America (Traub et al., 1983). Currently, only two species, *Ceratophyllus styx riparius* Jordan and Rothschild, 1920 with records from nests of Bank Swallows (*Riparia riparia*) from Rosslyn, Fairfax County, Virginia (Jordan, 1929) and *Ceratophyllus idius* Jordan and Rothschild, 1920 with two records from Purple Martins (*Progne subis*) from the coast of Virginia (Benton, 1980) are known to occur in Virginia. Most bird fleas are parasites of swallows, cavity or ground-nesting birds, and their nests (Traub et al., 1983). There is a growing literature to document that ectoparasites such as fleas (Brown & Brown, 1986; Dufva & Allander, 1996; Kedra et al., 1996; Rytkonen et al., 1998; Merino et al., 1999), ticks (King et al., 1977), and mites (Moller, 1990; Merino & Potti, 1995) have adverse effects on the health and reproductive success of birds. However, there is no evidence that cimicids called swallow bugs (Order Hemiptera) transmit any infectious agents to birds, but the blood loss they cause may be debilitating. Herein, we report one new flea and one cimicid record for the state of Virginia.

### MATERIALS AND METHODS

Abandoned nests were collected in the field from bird boxes, trees, under bridges, and in cavities in riverbanks from numerous localities in Virginia from May 1984 to August 2001. Collections were chiefly

random but included localities from all physiographic provinces of Virginia. Three Eastern Bluebird (*Sialia sialis*) nestbox "lines" were sampled intensively. In 1995, 28 nestboxes were monitored from May to August at Huntley Meadows Park, Fairfax County, VA. On 27 February 1999, nests from 48 bluebird boxes were collected at the Smithsonian Institution Center for Research and Conservation, Front Royal, Warren County, VA. In the summer of 2001 a total of 315 nests from bluebird boxes was sampled from the counties of Fauquier, Loudoun, and Prince William in northern Virginia. The 2001 samples included nests of 149 Eastern Bluebirds, 74 House Sparrows (*Passer domesticus*), 55 Tree Swallows (*Tachycineta bicolor*), 11 European Starlings (*Sturnus vulgaris*), and 26 miscellaneous others. Most nests were collected soon after the young birds had fledged. The nests were placed in plastic bags individually with collection data noted. A very few nests had a moist paper towel added to the bag; the towel was examined for several days to detect possible emerging adult fleas but none was found. Most nests were placed in a Berlese funnel as soon as possible. The funnel was operated for 24-48 h and the parasites were collected in 70% ethanol. Cimicids were picked out of the nest fragments with forceps and preserved in 70% ethanol. All fleas and some of the swallow bugs were decolorized in 10% KOH, dehydrated in ethanol, cleared in xylene, and mounted on slides in Canada balsam. Vouchers have been deposited in the collections of the Virginia Museum of Natural History (accession number 2000-079) and in the collection of the authors. Bird names follow the AOU checklist (1998).

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<sup>1</sup> Deceased

## RESULTS

Five hundred forty-seven nests of 24 known species of birds and nine nests of unknown species were examined (Table 1). Four nests contained fleas whose normal hosts are birds (0.7%) but eight (1.4%) had mouse fleas, *Orchopeas leucopus* (Baker, 1904). The latter included four Barn Swallow nests from Highland County (n = 1, 4, 6, and 7 fleas) and four Eastern Bluebird nests from Fauquier (n = 3 and 11), Prince William (n = 1), and Warren (n = 4) counties. One Bank Swallow nest contained 45 mouse fleas *Eptedia wenmanni* (Rothschild, 1904). Four nests (0.7%) had the squirrel flea, *Orchopeas howardi* (Baker, 1895), including two Field Sparrow (*Spizella pusilla*) nests from Loudoun Co. (one flea each) and bluebird nests from Fauquier (n = 14 fleas) and Loudoun (n = 1)

counties. Two additional nests contained both mouse and squirrel fleas: a Field Sparrow nest from Loudoun Co. contained 37 *O. howardi* and one *E. wenmanni*, and a bluebird nest from Prince William Co. had two *O. howardi* and one *O. leucopus*.

The four nests with bird fleas were one Purple Martin with 98 *Ceratophyllus idius* (VA, Accomack Co., Chincoteague, 28 September 1985); one Tree Swallow with three *C. idius* (VA, Warren Co., Front Royal, 27 February 1999); and two Cliff Swallow (*Hirundo pyrrhonota*) nests (both VA, Louisa Co., Bumpass, 21 November 1992) with 11 and 20 *Ceratophyllus celsus celsus* Jordan, 1926. The same two Cliff Swallow nests from the Bumpass site also yielded hundreds of adults and nymphs of the swallow bug *Oeciacus vicarius* Horvath, 1912, (Insecta: Cimicidae).

Table 1. List of the bird nests examined for bird fleas and swallow bugs in Virginia.

Family	Species	Nests examined	Number of Parasites
Anatidae	Wood Duck ( <i>Aix sponsa</i> )	3	0
Tyrannidae	Eastern Phoebe ( <i>Sayornis phoebe</i> )	28	0
Hirundinidae	Purple Martin ( <i>Progne subis</i> )	2	98 <i>Ceratophyllus idius</i>
	Tree Swallow ( <i>Tachycineta bicolor</i> )	75	3 <i>Ceratophyllus idius</i>
	Cliff Swallow ( <i>Hirundo pyrrhonota</i> )	7	11 <i>Ceratophyllus celsus</i> 20 <i>Ceratophyllus celsus</i> many <i>Oeciacus vicarius</i>
	Barn Swallow ( <i>Hirundo rustica</i> )	61	0
	Bank Swallow ( <i>Riparia riparia</i> )	3	0
Paridae	Carolina Chickadee ( <i>Poecile carolinensis</i> )	11	0
	Tufted Titmouse ( <i>Baeolophus bicolor</i> )	5	0
Sittidae	White-breasted Nuthatch ( <i>Sitta carolinensis</i> )	1	0
Troglodytidae	Carolina Wren ( <i>Thryothorus ludovicianus</i> )	4	0
	House Wren ( <i>Troglodytes aedon</i> )	18	0
Sylviidae	Blue-gray Gnatcatcher ( <i>Poliophtila caerulea</i> )	1	0
Turdidae	American Robin ( <i>Turdus migratorius</i> )	7	0
	Eastern Bluebird ( <i>Sialia sialis</i> )	204	0
Mimidae	Northern Mockingbird ( <i>Mimus polyglottos</i> )	1	0
Sturnidae	European Starling ( <i>Sturnus vulgaris</i> )	11	0
Parulidae	Yellow Warbler ( <i>Dendroica petechia</i> )	3	0
Emberizidae	Chipping Sparrow ( <i>Spizella passerina</i> )	5	0
	Field Sparrow ( <i>Spizella pusilla</i> )	4	0
Cardinalidae	Northern Cardinal ( <i>Cardinalis cardinalis</i> )	3	0
Icteridae	Red-winged Blackbird ( <i>Agelaius phoeniceus</i> )	6	0
Fringillidae	House Finch ( <i>Carpodacus mexicanus</i> )	2	0
Passeridae	House Sparrow ( <i>Passer domesticus</i> )	82	0
	Unidentified birds	9	0
	TOTAL	556	4

## DISCUSSION

Relatively few records exist for bird fleas (Benton & Shatrau, 1965) and swallow bugs (Usinger, 1966) from eastern North America. *Ceratophyllus idius* is a parasite of tree swallows, martins, and bluebirds, species that use birdhouses. One would think that they would be well collected, yet Benton (1980) listed only 39 localities in eastern United States. Holland (1985) added 10 additional sites from Ontario, Quebec, New Brunswick, and Newfoundland in Canada. We collected our specimens in September from an abandoned Purple Martin apartment house and in February from an unoccupied bluebird box containing the typical nest of a Tree Swallow. This species is probably more common and widespread in Virginia than is now known.

*Ceratophyllus c. celsus* is a true parasite of the Cliff Swallow. It ranges from Alaska to New Brunswick and south to Texas, but there are few records for eastern North America. Holland (1985) listed 10 records for Quebec, Ontario, and New Brunswick in Canada; Galloway (1987) reported 10 additional sites from Ontario. There are only seven reported collections in the eastern United States from Illinois (2), Michigan (1), New York (3), and Vermont (1) (Benton, 1980). The Virginia record is the southernmost. In eastern North America *C. celsus* is the only member of the genus *Ceratophyllus* found in Cliff Swallow nests. In western North America it is replaced by *Ceratophyllus petrochelidoni* Wagner, 1936 and *Ceratophyllus scopulorum* Holland, 1952 (Pilgrim & Galloway, 2000). The domed Cliff Swallow nests that were infested were collected under a bridge spanning an arm of Lake Anna. Within a meter of the Cliff Swallow nests were located Barn Swallow nests. The latter contained no fleas or swallow bugs.

Although *Oeciacus vicarius* is very common in Cliff Swallow nests in western United States, there are only a few records from New England and New York in the East (Usinger, 1966). This species has not previously been reported from Virginia. The Bumpass locality is the southernmost occurrence east of the Mississippi River. All stages of the parasite overwinter in unoccupied nests; populations in Oklahoma were observed to peak in late summer (August-September) (Loye & Hopla, 1983). Barn Swallows and Bank Swallows are other known hosts and Usinger (1966) stated that in California, every Cliff Swallow nest that he examined was infested.

From our data we conclude that bird fleas are relatively uncommon in Virginia because only 0.7% of the 556 nests examined were infested. This is probably true because this is the southern limit of geographic distribution for most species of bird fleas. It is also

apparent that mice and squirrels visit and use bird boxes and bird nests and leave their fleas behind.

Bird fanciers who maintain nest boxes for Eastern Bluebirds and Purple Martins could make a contribution to the knowledge of distribution of these parasites by submitting parasites found in the nests or on birds to the authors or to the Virginia Museum of Natural History for identification. Placing the parasites in a plastic bag containing a paper towel soaked in rubbing alcohol, with collection data indicating species of the host or nest, state, county, town, date, and name of collector would assure maximum value of the collection. Even the larvae of swallow fleas preserved in alcohol are identifiable now thanks to a key produced by Pilgrim & Galloway (2000).

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